

# PATENT ABSTRACTS OF JAPAN

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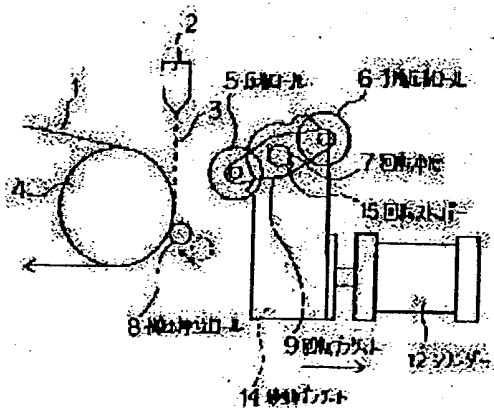
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(71)Applicant : NIPPON STEEL CORP

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(72)Inventor : FUNAKI MICHIIHIRO  
ONO TAKAHISA  
SUGIMOTO HARUHISA

## (54) PRODUCTION OF LAMINATED METAL PANEL AND ROLL REPLACING DEVICE



### (57)Abstract:

**PURPOSE:** To rapidly perform the replacement of a roll during the passage of a panel without stopping a line by moving a press bonding roll in a pressure non-contact direction using a roll replacing device to replace the same with other press bonding roll and bringing the replaced press bonding roll into contact with a metal panel coated with a thermoplastic resin under pressure.

**CONSTITUTION:** A moving bracket 14 is moved in a pressure non-contact direction by a cylinder 12 and a rotary bracket 9 is rotated in such a state that a press bonding roll 5 is separated from a winding roll 4 to replace the press bonding roll 5 with a preparatory press bonding roll 6. Next, the moving bracket 14 is moved in a pressure contact direction by the cylinder 12 and the replaced preparatory press bonding roll 6 is brought into contact with a metal panel 1 coated with a thermoplastic resin under pressure to produce a laminated metal panel. For example, the press

bonding roll is set to a prescribed pressure contact position by providing a rotary stopper 15

such as a fixing pin to the holes piercing the rotary bracket 9 and the moving bracket 14 to fix the rotary bracket 9.

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## LEGAL STATUS

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## MEANS

[Means for Solving the Problem] this invention carries out the pressure welding of the sticking-by-pressure roll to the metal plate twisted around the roll with (1) volume, and it flows down the thermoplastics film fused from the T die through the extruder in the gap of a sticking-by-pressure roll and a metal plate. In the method of covering thermoplastics to a metal plate and manufacturing a lamination metal plate The method, [0019] which move a sticking-by-pressure roll to an anti-pressure-welding side using a roll swap device, carry out the pressure welding of the sticking-by-pressure roll which exchanged and exchanged the sticking-by-pressure roll for other sticking-by-pressure rolls to the metal plate which has covered thermoplastics, and manufacture a lamination metal plate (2) Carry out the pressure welding of the sticking-by-pressure roll to the preheated metal plate which was twisted around the roll with a volume. It is a sticking-by-pressure roll swap device in the equipment which flows down the thermoplastics film fused from the T die through the extruder in the gap of a sticking-by-pressure roll and a metal plate, covers thermoplastics to a metal plate, and manufactures a lamination metal plate. The move bracket which can move in the direction of a pressure welding and the direction of an anti-pressure welding of a sticking-by-pressure roll freely, It is supported to revolve by this move bracket. The rotation bracket of a right-and-left couple which can rotate freely, The roll swap device which consists of the sticking-by-pressure roll and preliminary sticking-by-pressure roll which were loaded in the ends of the rotation bracket of this couple, and a rotation stopper of the rotation bracket which rotates a rotation bracket in a sticking-by-pressure roll position, and fixes this preliminary sticking-by-pressure roll, [0020] (3) Carry out the pressure welding of the sticking-by-pressure roll which was twisted around the roll with a volume and which was backed up by the preheated metal

plate by the back up roll. It is a sticking-by-pressure roll swap device in the equipment which flows down the thermoplastics film fused from the T die through the extruder in the gap of a sticking-by-pressure roll and a metal plate, covers thermoplastics to a metal plate, and manufactures a lamination metal plate. The move bracket which can move in the direction of a pressure welding and the direction of an anti-pressure welding of a sticking-by-pressure roll freely, The back up roll which was loaded in this move bracket and which can be rotated, The rotation bracket of the right-and-left couple prepared in the ends of this back-up-roll shaft free [ rotation ], The roll bearing bracket prepared in the both ends of the outside of the back up roll of the rotation bracket of this couple free [ rotation ], The sticking-by-pressure roll and preliminary sticking-by-pressure roll which were supported to revolve by this roll bearing bracket, the roll swap device characterized by the bird clapper from the rotation stopper of the rotation centering-control mechanism of the roll bearing bracket prepared between the roll bearing bracket and the rotation bracket, and the rotation bracket which rotates a rotation bracket in a sticking-by-pressure roll position, and fixes a preliminary sticking-by-pressure roll -- it comes out

[0021] Based on a drawing, the procedure of roll exchange is explained below.

[0022] The pressure welding of the sticking-by-pressure roll is carried out to the metal plate twisted around the roll with a volume, the thermoplastics film fused from the T die through the extruder in the gap of a sticking-by-pressure roll and a metal plate is carried out under a grain, and thermoplastics is covered to a metal plate.

[0023] When a crack is discovered by the sticking-by-pressure roll by observation of a roll or coat surface observation, roll exchange is the procedure of drawing 2 -5, and a sticking-by-pressure roll is moved to an anti-pressure-welding side ( drawing 2 ), it is stuck by pressure to the metal plate have covered thermoplastics in the sticking-by-pressure roll which exchanged and ( drawing 3 , drawing 4 ) exchanged the sticking-by-pressure roll for other sticking-by-pressure rolls, and it manufactures a lamination ( drawing 5 ) metal plate.

[0024] In addition, in order not to carry out the pressure welding of the resin in the state of drawing 2 , adhesion to a metal plate is poor, and when the portion which has floated in part occurs and problems, such as being caught on a lower stream of a river, occur, in case the pressure welding of a sticking-by-pressure roll is removed, you may press down with another roll auxiliary on the lower stream of a river of a pressure-welding position.

[0025] However, distance until a resin fixes from a T die in this case becomes long, and the relation of a neck in to covering width of face becomes small, and does not become a product.

[0026] In drawing 3 and drawing 4 , in order to exchange quickly, a roll is rotated by the turret method.

[0027] Next, drawing 2 explains the example of a roll swap device about a turret method.

[0028] That is, a rotation bracket rotates to a sticking-by-pressure roll position in the sticking-by-pressure roll and the preliminary sticking-by-pressure roll which was supported to revolve by the move bracket which can move in the direction of a pressure welding, and the direction of an anti-pressure welding freely, and this move bracket in the sticking-by-pressure roll, and was loaded in the ends of the rotation bracket of a right-and-left couple which can rotate freely, and the rotation bracket of this couple, and this preliminary sticking-by-pressure roll, and the roll swap device of this invention consists of rotation stoppers of

[0029] In the operation, by moving a move bracket in the direction of an anti-pressure welding in a cylinder 12, being in the state which the sticking-by-pressure roll separated from the roll with a volume, and rotating a rotation bracket, it is exchanged for a preliminary sticking-by-pressure roll in the procedure of drawing 3 and drawing 4 , and a move bracket moves in the direction of a pressure welding in a cylinder, a pressure welding is carried out to the metal plate have covered thermoplastics in the exchanged preliminary sticking-by-pressure roll, and a sticking-by-pressure roll manufactures a lamination metal plate.

[0030] In addition, a sticking-by-pressure roll is set to a predetermined pressure-welding

position by forming a rotation stopper 15 like a lock-pin in the hole which for example, the rotation bracket and the move bracket were made to penetrate, and making a rotation bracket fix to it.

[0031] Moreover, in order to raise crosswise uniform pressing-down nature, a back up roll may be used and the roll swap device in this case is explained using drawing 6.

[0032] Namely, the move bracket which the roll swap device in this case can move in the direction of a pressure welding and the direction of an anti-pressure welding of a sticking-by-pressure roll freely, The back up roll which was loaded in this move bracket and which can be rotated, The rotation bracket of the right-and-left couple prepared in the ends of this back-up-roll shaft free [ rotation ], The roll bearing bracket prepared in the both ends of the outside of the back up roll of the rotation bracket of this couple free [ rotation ], The sticking-by-pressure roll and preliminary sticking-by-pressure roll which were supported to revolve by this roll bearing bracket, It consists of a rotation centering-control mechanism of the roll bearing bracket prepared between the roll bearing bracket and the rotation bracket, and a rotation stopper 15 of the rotation bracket which rotates a rotation bracket in a sticking-by-pressure roll position, and fixes a preliminary sticking-by-pressure roll.

[0033] In the operation, by moving a move bracket in the direction of an anti-pressure welding in a cylinder 12, being in the state which the sticking-by-pressure roll separated from the roll with a volume, and rotating a rotation bracket, it is exchanged for a preliminary sticking-by-pressure roll in the procedure of drawing 7 - drawing 11, and a move bracket moves in the direction of a pressure welding in a cylinder, a pressure welding is carried out to the metal plate have covered thermoplastics in the exchanged sticking-by-pressure roll, and a sticking-by-pressure roll manufactures a lamination metal plate.

[0034] In addition, a sticking-by-pressure roll is set to a predetermined pressure-welding position by forming a rotation stopper 15 like a lock-pin in the hole which for example, the rotation bracket and the move bracket were made to penetrate, and making a rotation bracket fix to it.

[0035] furthermore, as a rotation centering-control mechanism of a roll bearing bracket For example, even if it forms a spring 11 and the roll bearing bracket stopper 16, and is fixed to the position where a preliminary sticking-by-pressure roll does not contact a back up roll and it faces rotation of a rotation bracket In case it prevents, a move bracket moves in the direction of a pressure welding and the pressure welding of a preliminary sticking-by-pressure roll hanging down and falling is carried out, positioning of a sticking-by-pressure roll is carried out by the spring 11 and the roll bearing bracket stopper 16 so that a preliminary sticking-by-pressure roll may become a predetermined pressure-welding position. An example explains below.

[0036]

[Example 1] After using the lamination metal plate manufacturing installation using the roll with a volume with an outer diameter of 300mm, and the sticking-by-pressure roll with an outer diameter of 100mm and preheating this steel plate, using a surface treated steel sheet with a thickness [ of 0.2mm ], and a width of face of 800mm as a metal plate, it was cooled to ordinary temperature by the water spray, and the steel plate which carried out melting extrusion flowing down and laminated the polyethylene terephthalate from the T die through the extruder in the interface of the above-mentioned steel plate and a sticking-by-pressure roll was dried and rolled round

[0037] In addition, a sticking-by-pressure roll is pressed down by the back up roll with an outer diameter of 200mm, and is stuck to a roll with a volume by pressure.

[0038] Although crosswise uniform pressing-down nature improves by being stuck by pressure using a back up roll, if the rolling force in consideration of the rigidity of a sticking-by-pressure roll is selected even if there is this [ no ], the bottom of the overpressure of the edge by the bending of a roll can be prevented, and there will be especially no problem.

[0039] After carrying out about 100 ton manufacture of the steel plate, since it discovered by viewing that the crack is contained in a sticking-by-pressure roll, it exchanged the sticking-by-pressure roll by the method shown in drawing 7-11, and has continued operation still more nearly continuously.

[0040] Moreover, the auxiliary roll with an outer diameter of 50mm was used near the lower stream of a river of a sticking-by-pressure roll for the presser foot of a resin at this time.

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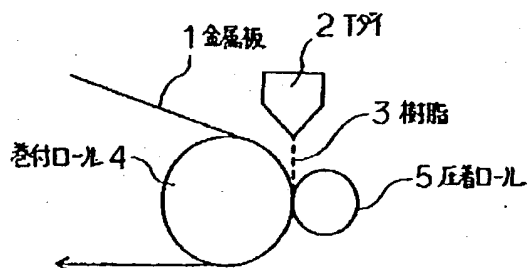
## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

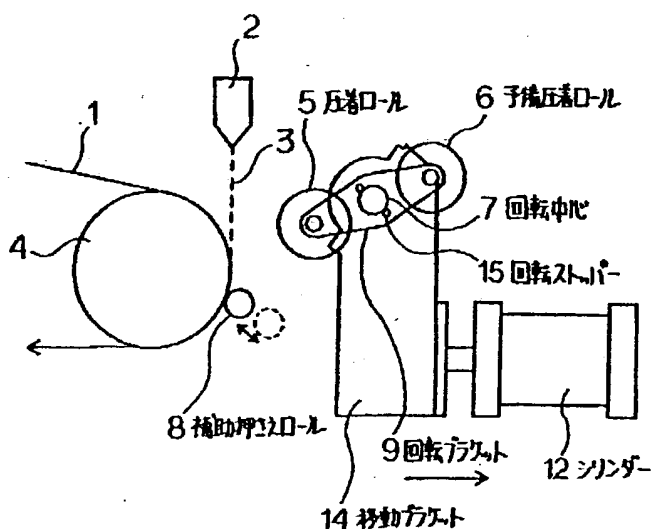
[Drawing 1] It is explanatory drawing of the method of covering by flowing down a melting resin to the interface of a metal substrate and a roll.

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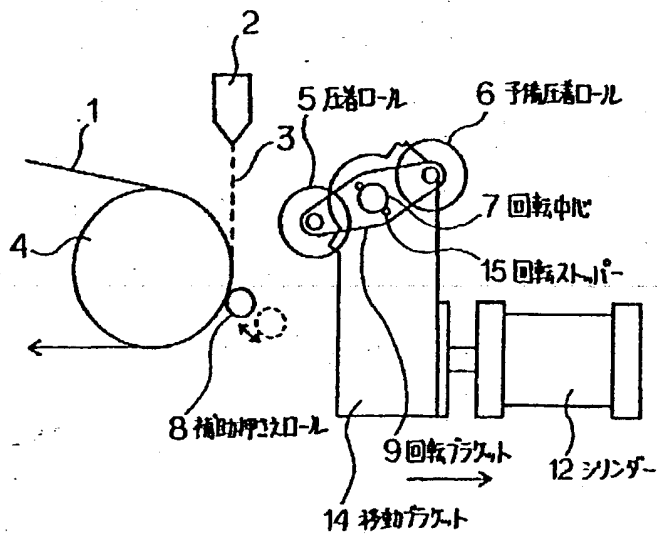


[Drawing 2] Explanatory drawing of the roll exchange method.

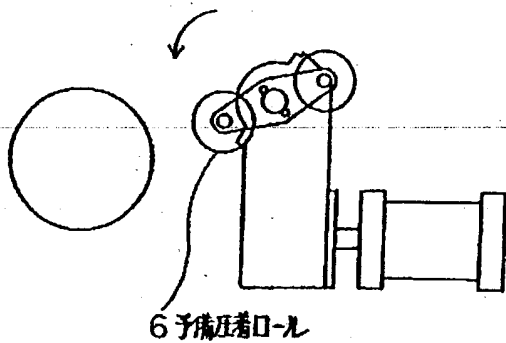
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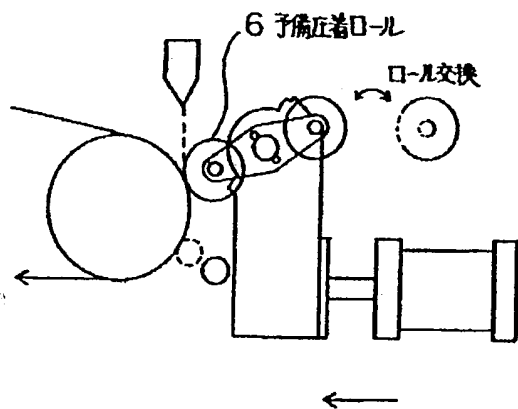
[Drawing 3] Explanatory drawing of the roll exchange method.



[Drawing 4] Explanatory drawing of the roll exchange method.

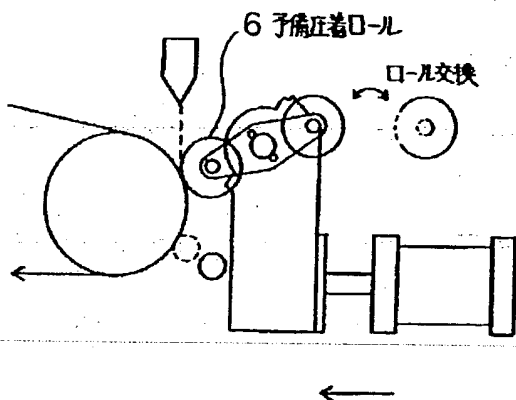


[Drawing 5] Explanatory drawing of the roll exchange method.



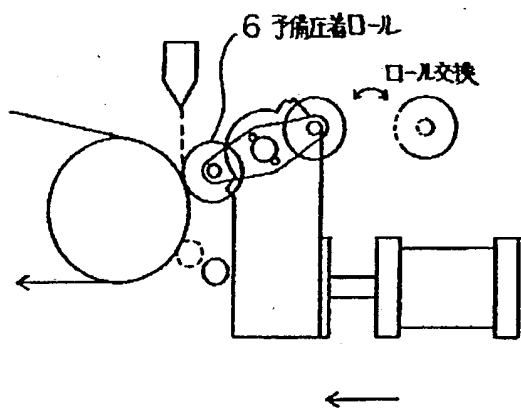
[Drawing 6] Explanatory drawing of a roll swap device.

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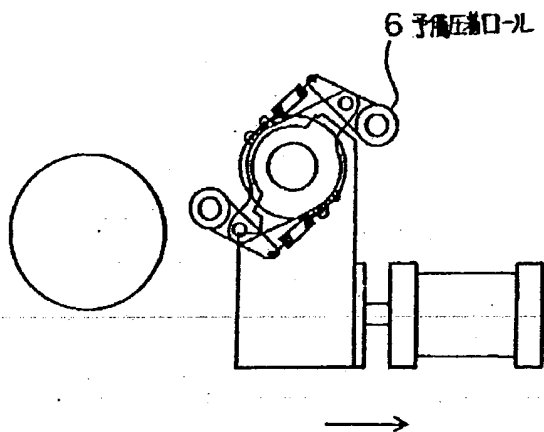


[Drawing 7] Explanatory drawing of the roll exchange method.

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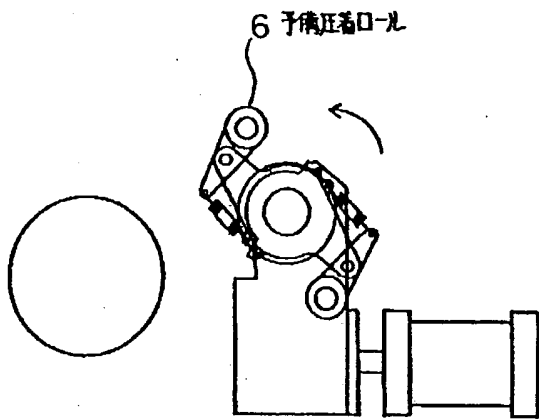


[Drawing 8] Explanatory drawing of the roll exchange method.

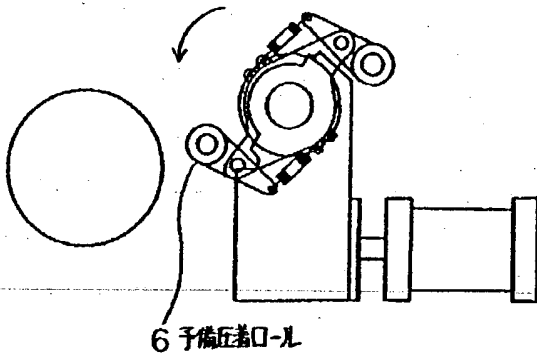


[Drawing 9] Explanatory drawing of the roll exchange method.

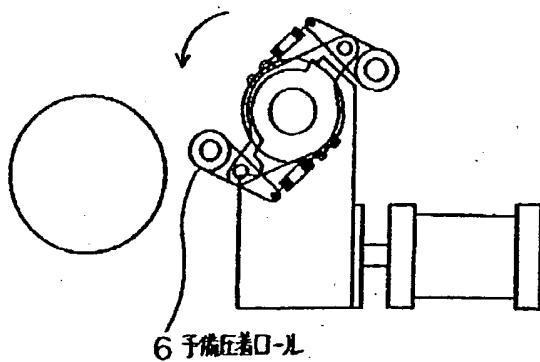




[Drawing 10] Explanatory drawing of the roll exchange method.



[Drawing 11] Explanatory drawing of the roll exchange method.



[Description of Notations]

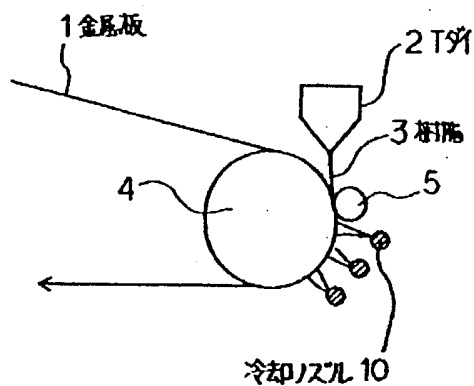
1 Metal Plate

2 T Die

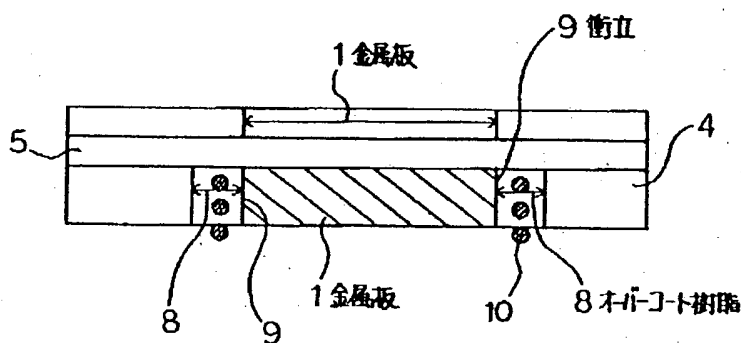
3 Thermoplastics

4 Twist and it is Roll.

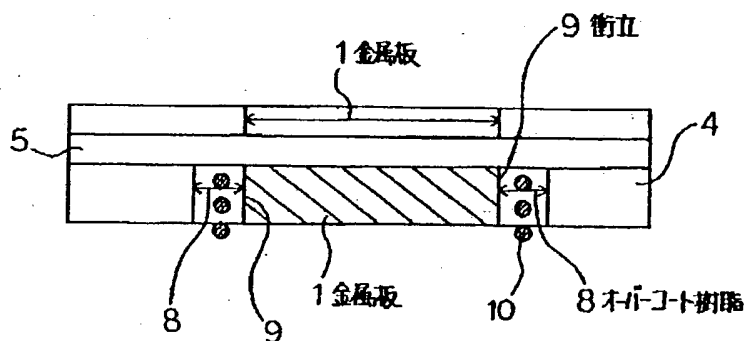
- 5 Sticking-by-Pressure Roll
  - 6 Preliminary Sticking-by-Pressure Roll
  - 7 Center of Rotation (Turret)
  - 8 Auxiliary Presser-Foot Roll
  - 9 Rotation Bracket
  - 10 Roll Bearing Bracket
  - 11 Spring
  - 12 Cylinder
  - 13 Back Up Roll
  - 14 Move Bracket
  - 15 Rotation Stopper
  - 16 Roll Bearing Bracket Stopper
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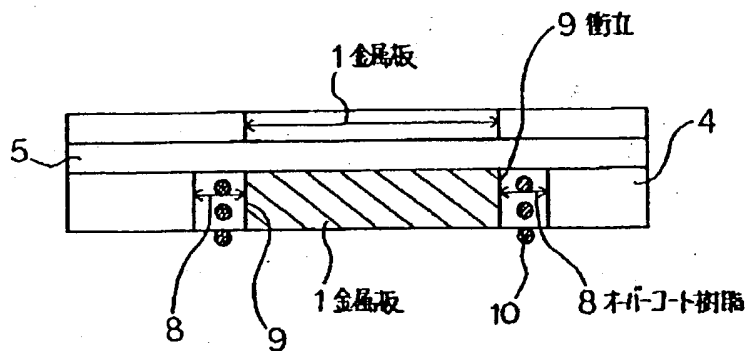
[Drawing 3] Explanatory drawing of this invention method which shows a screen position.



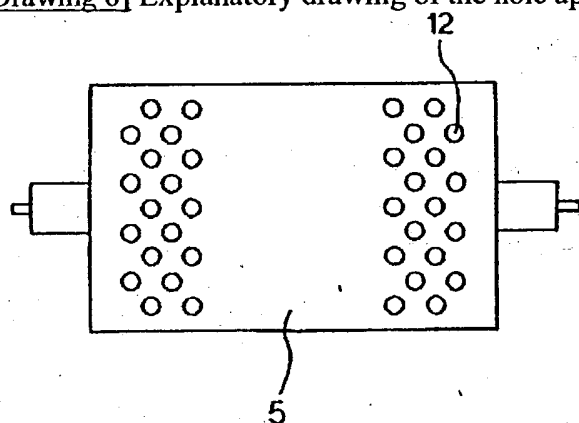
[Drawing 4] Explanatory drawing of the example which cools a roll with a volume by the cooled nozzle.



[Drawing 5] Explanatory drawing of the example which cools a roll with a volume by the cooling roller.



[Drawing 6] Explanatory drawing of the hole aperture roll used in the example.



[Description of Notations]

- 1 Metal Plate
- 2 T Die
- 3 Thermoplastics
- 4 Twist and it is Roll.
- 5 Sticking-by-Pressure Roll
- 6 Cooling System
- 7 Water Spray Cooling System
- 8 Overcoat Resin
- 9 Screen
- 10 Cooled Nozzle
- 11 Cooling Roller
- 12 Opening